TWO ISOPODS OF THE NEVADA TEST SITE[1]

Dorald M. Allred[2], and Stanley Mulaik[3]

During ecological studies over a four-year period at the Nevada Test Site (Allred, Beck, and Jorgensen, 1963a), 490 isopods of only two species were collected. These were determined by Dr. Stanley Mulaik as representing 381 specimens of *Armadillo arizonicus* (Mulaik) and 109 specimens of *Porcellio laevis* Latrielle. They were collected principally in sunken can traps (described by Allred, Beck and Jorgensen, 1963a) which were operated continuously for at least one year in nine areas representing seven major plant communities. In 19 other areas of the site, cans were operated only for a two-week period during a summer. This resulted in a total of 51,992 can trap-nights over the four-year period.

Armadillo arizonicus

(Tables 1 and 2, Fig. 1)

Isopods of this species were found in seven vegetation types as shown in Table 2. They were most commonly associated with *Lycium pallidum* and least with *Atriplex confertifolia-Kochia americana*. Within some plant communities the concentration of animals was somewhat localized. In the Mixed (Xeric) community the two collecting transects were only 825 feet apart, yet there were more than five times as many isopods taken from one transect than from the other. This same situation also occurred in the Larrea-Franseria, Lycium, and Grayia-Lycium communities. In the latter study area four collecting transects, each 1.5 miles long, ran NE, SE, SW and NW, respectively, from a central point (refer to Allred, *et al.*, 1963a, Fig. 12). Over 88 percent of the isopods taken were found on the NE transect, and 70 percent of the animals on this transect were taken at one collecting station. A similar situation was found in the Lycium study where more than 70 percent of the isopods from one transect were found at two adjacent stations. On the other transect over 40 percent of the animals were taken at one station.

In the total collection of adult isopods the sex ratio was 1:1, but this varied between different plant communities. In the Mixed (Xeric) community the ratio of males to females was 2:1, in the Lycium 3:4, in the Grayia-Lycium 1:2, with slight differences in the other communities.

Seasonally, *A. arizonicus* was active only from May through October (Fig. 1). Highest populations occurred during August for the adults and July through September for immatures. Seasonal appearance of males and females was similar in all communities except in

1. Atomic Energy Commission Report No. COO-1355-4. Field work completed under AEC Contract AT(11-1)786 with Brigham Young University.
2. Department of Zoology and Entomology, Brigham Young University.
3. Department of Zoology, University of Utah.

Table 1. Collection localities* of isopods at the Nevada Test Site, Nye County, Nevada.

Armadillo arizonicus

8 ♂ 15 ♀ 31 im., Study IB, Ground zero 1 to radius of 1.5 mi.
7 ♂ 11 ♀ 9 im., Study 5A, 0.2 mi. E. of Mercury Highway S of Well 5B road.
5 ♂ 9 ♀ 1 im., Study 5CQ, 0.3 mi. E. of Mercury Highway, N of Well 5B road.
34 ♂ 43 ♀ 90 im., Study 5E, 1.1 mi. E. of Mercury Highway, thence 1 mi. S of Well 5B road.
1 ♂, Study 6A, 0.5 mi. S of Well 3B, thence 0.6 mi. E.
2 ♂ 6 ♀ 1 im., Study 10D, 9.5 mi. N. of Well 3B along Groom Lake road, thence 0.5 mi. E.
16 ♂ 14 ♀ 1 im., Study CB, Environs of Cane Springs.
50 ♂ 25 ♀ 2 im., Study JA, 9.3 mi. W. of Mercury along Jackass Flats Highway, thence 1000 ft. SW.

Porcellio laevis

1 im., Study 10B, 9 mi. N. of Well 3B along Groom Lake road, thence 0.4 mi. W.
36 ♂ 58 ♀ 16 im., Study CB, Environs of Cane Springs.

*For specific location refer to Allred, Beck, and Jorgensen, 1963b.

Larrea-Franseria where the males did not appear in the collections until August.

Porcellio laevis
(Table 1, Fig. 2)

All but one of the 109 specimens were taken at Cane Springs in a Mixed (Mesic) plant community. The one exception was taken in a Coleogyne area. Over 90 percent of those at Cane Springs were found at the three adjacent stations closest to a pond.

The ratio of males to females was 1:1.6. Seasonally, highest populations of adult males appeared during August through December, and females during August through October (Fig. 2).

Discussion

It is unusual that so few species of isopods are represented at the test site. It is unlikely that other species, if present, are widely distributed. However, if the isopods tend toward localized and seasonal populations as demonstrated by the two species collected, then other species may exist at the test site in specific areas where we have not done extensive collecting on a year-round basis. Some isopods do not roam about as do *P. laevis* and *A. arizonicus*. Others climb onto plants and may be obtained by sweeping. However, our extensive sweeping of plants for other arthropods has still not yielded isopods other than the two species taken. Furthermore, we collected the entire plant and ground debris of eleven species monthly over a

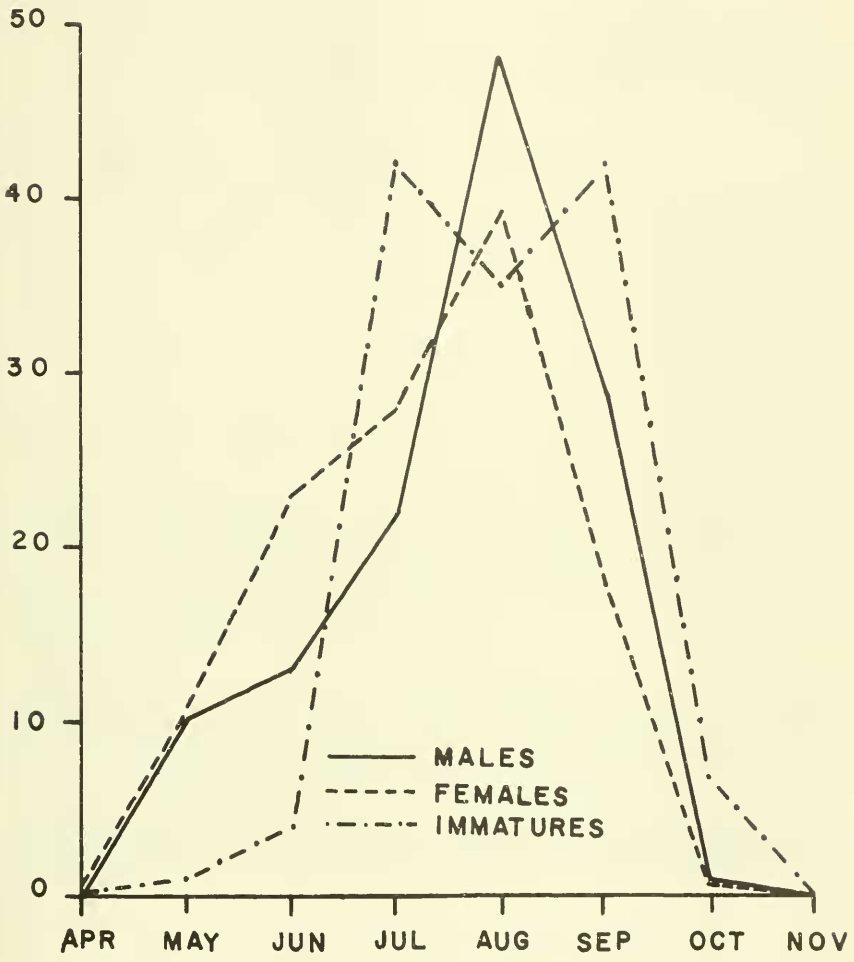

Fig. 1. Seasonal abundance of *Armadillo arizonicus*.

year's period (Allred and Beck, 1964), but not a single isopod was found. In addition to the buried can and other methods of collecting, considerable searching was made for isopods under rocks, fallen trees, and in plant humus. Nevertheless, our relatively limited collecting over the 1,000 square-mile area of the test site and our somewhat selective methods of sampling leave some question as to the complete isopod fauna of the site. It is evident that more specific investigations on the ecology of isopods in desert areas need to be made.

The occurrence of isopods around moist situations such as *P. laevis* at Cane Springs is not surprising. However, large populations of those such as *A. arizonicus* in such xeric habitats are not usually

Table 2. Relative abundance of *Armadillo arizonicus* in several plant communities at the Nevada Test Site.

	Atriplex-Kochia	Coleogyne	Grayia-Lycium	Larrea-Franseria	Lycium	Mixed (Mesic)	Mixed (Xeric)
Actual number collected	1	9	53	42	168	31	77
Relative abundance adjusted by no. of collecting attempts	2	20	53	78	381	53	169

expected. The differences in relative abundance of *A. arizonicus* in different plant communities are difficult to explain on the basis of either plant-food relationships or edaphic factors. Little is known of the feeding preferences of this species of isopod relative to organic debris. Rockiness of the soil and moisture conditions vary considerably between some plant communities at the test site. On the high mesas there are rocky situations and generally a greater degree of moisture which are more conducive to optimum conditions than in the drier valleys. Yet not a single isopod of either species was taken in our mesa studies. In the Lycium area where *A. arizonicus* occurred in greatest abundance there are essentially no surface rocks of a size that would provide suitable habitats for the isopods, and the soil is loose sandy-clay. This area is adjacent to the Frenchman Flat playa which is dry for most of the season. Other than this area *A. arizonicus* was found most abundantly in a Mixed community where the condition is also xeric but large rocks are abundant. In both plant communities the total plant cover is considerably less than in

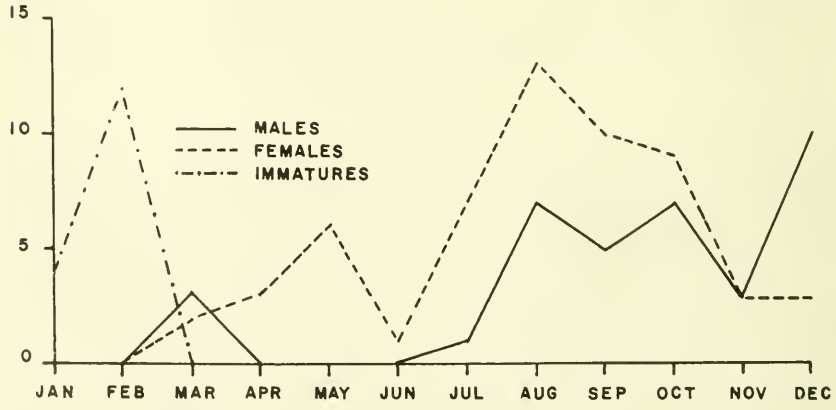

Fig. 2. Seasonal abundance of *Porcellio laevis*.

the Atriplex-Kochia and Coleogyne areas where populations of *A. arizonicus* were lowest. Except for the Grayia-Lycium site each of our study areas was established in areas where the vegetation was considered to be rather uniform. This was confirmed by vegetation analyses made by the line-intercept method.

Apparently there is no plant association which influences the occurrence and abundance of *A. arizonicus*. As far as is known, the edaphic factors within each of the study areas are generally uniform throughout. Further detailed studies are needed, however, to determine why populations of *A. arizonicus* are localized and more abundant around one small area than around another which is apparently similar.

The almost exclusive occurrence of *P. laevis* near a constant water source indicates that it requires a more mesic habitat than does *A. arizonicus*. It is likely that the Cane Springs habitat supplies more decaying, moldy food than is to be found in drier areas on the test site.

The seasonal activity of *A. arizonicus* occurred between May and October when temperatures are highest and rainfall lowest at the test site. On the other hand, *P. laevis* was active every month of the year in an area where moisture was available the year round, but where temperatures varied little from those of the more xeric conditions of the habitats of *A. arizonicus*.

Literature Cited

Allred, D. M., D E. Beck, and C. D. Jorgensen. 1963a. Biotic Communities of the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser., II(2): 1-52.

———. 1963b. Nevada Test Site Study Areas and Specimen Depositories. Brigham Young Univ. Sci. Bull., Biol. Ser., II(4):1-15.

Allred, D. M. and D E. Beck. 1964. Arthropod Associates of Plants at the Nevada Test Site. Brigham Young Univ. Sci. Bull., Biol. Ser., V(2):1-16.